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MILK PRICES, FEED COSTS AND A REPRESENTATIVE DAIRY FARM'S NET INCOME

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Executive Summary

Dairy farmers are faced with decreasing milk prices and increasing feed costs. On January 1, 1988 the Secretary of Agriculture cut the milk support price by 50 cents. Milk prices that farmers receive have fallen since the support price cut. Further milk price declines are possible during 1989 and 1990.

During the middle 1980s, prices that dairy farmers paid for feeds -- such as corn and soybean oil meal -- have been relatively low. Prices for corn, soybean oil meal, and other protein feeds have increased during the first half of 1988. What feed prices will do in the future is difficult to predict. However, general trends suggest that feed prices will not decline, and may increase further.

Both declining milk prices and increasing feed costs reduce a dairy farm's after-tax net farm income. To evaluate the net farm income decline, a representative dairy farm's financial performance is simulated over a four year period. The simulated farm has 50 cows producing 16,000 pounds of milk. All corn, corn silage, and hay fed to dairy animals is grown on 240 acres of owned land.

Simulated results for the representative farm indicate that net farm income in 1988 is $4,588 lower than net farm income in 1987. The reduction results from (1) a decline in the 3.5 percent B.F. blend milk price from $11.80 in 1987 to $11.30 in 1988, and (2) an increase in purchased feed costs from $151 per cow in 1987 to $199 per cow in 1988.

To have the same income in 1988 as in 1987, the representative dairy farm would have to either:

(1) increase milk production per animal by 986 pounds (a 6.1 percent increase),
(2) reduce variable costs per animal by $79 (a 7.9 percent decrease), or
(3) decrease the farm's overhead costs by $3,330 (a 3.4 percent decrease).

Many measures may have to be implemented to obtain an increase in milk production or a reduction in either variable or overhead costs. Measures include increasing milk production by implementing improved feeding, health, and breeding programs; increasing production efficiencies by doing a better job of breeding cows and raising heifers; reducing purchased input costs; and making more efficient use of capital.

After-tax net farm incomes obviously depend on the magnitude of changes in milk and feed prices. Although the magnitudes are not known, the general direction is fairly certain. After-tax net farm incomes are likely to decrease, requiring some type of response from dairy farmers.

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Dairy farmers are faced with decreasing milk prices and increasing feed costs. For the past several years, Commodity Credit Corporation (CCC) purchases of milk have exceeded 5 billion pounds. If CCC purchases are estimated to exceed 5 billion pounds during a calender year, the Food Security Act of 1985 requires a 50 cent reduction in milk support price. Reduced milk support prices generally lead to lower milk prices for farmers. During the first half of 1988, for example, milk prices that farmers receive have fallen after the 50 cent milk support price cut occurring on January 1, 1988. Similar 50 cent support price reductions are possible at the beginning of 1989 and 1990.

During the middle 1980s, prices that dairy farmers paid for feeds -- such as corn and soybean oil meal -- have been relatively low. Prices for corn, soybean oil meal, and other protein feeds have increased during the first half of 1988. What feed prices will do in the future is difficult to predict. However, general trends suggest that feed prices will not decline, and may increase.

Decreasing milk prices and increasing feed prices reduce a dairy farm's after-tax net farm income. One objective of this paper is to determine the magnitude of the net farm income decline on a "representative" Ohio dairy farm. A second objective is to examine measures which can partially offset the decline in net farm income.

To accomplish these objectives, a simulation model is used to determine after-tax net farm incomes for differing milk and feed price combinations. After-tax net farm incomes represent returns to unpaid labor, management, and equity capital. Net farm incomes exceeding family consumption expenses indicate that farms are viable in the short run. Positive net farm incomes, however, do not necessarily indicate that the farm is profitable. To gauge profitability, charges for unpaid labor, management, and equity capital have to be considered.

Milk and feed price combinations are selected such that they represent 1987 prices, and projected 1988 and 1989 prices. Milk production increases and cost decreases then are found which equate 1988 and 1989 net farm incomes to the 1987 net farm income.

Methodology for Determining After-Tax Net Farm Incomes

After-tax net farm incomes for differing milk prices and feed costs are determined using a farm-level simulation model (Schnitkey, Barry, and Ellinger). The model simulates the financial performance of a farm business over a four year period, given a specification of a farm's resources and production, marketing, and financial activities.

The simulation model is used to determine average after-tax net farm incomes over a four year period. Average incomes are used, rather than single year net farm incomes, to identify trends in net farm income. Trends result when the farm begins accumulating debt because scheduled principal payments can not be met. This primarily occurs when withdrawals for family living expenses exceed net farm income.

Six milk and feed price combinations described latter in the paper are used to determine net farm incomes. When milk and feed prices are changed, all activities and other prices and costs are held constant.

The Simulated Farm: A "Representative" Ohio Dairy Farm

The simulated dairy farm is presumed to be owned and operated by one family. Data used to specify the farm are adapted from the 1988 Ohio Dairy Enterprise Budgets, 1988 Ohio Crop Enterprise Budgets, Ohio Crop Reporting Service, and Dairy Herd Improvement Monthly State Summaries. Production levels, costs, cash flows, and the financial situation are shown in table 1.

The farm has 50 Holstein cows. Milk sold per cow totals 16,000 pounds at 3.7 percent butterfat. Cull cow, bred heifer, and heifer calf sale prices equal $630, $850, and $125, respectively.

The farm owns 240 acres of farmland, of which 207 acres are tillable. No farmland is rented. All of the corn, corn silage, and alfalfa grown on the farm is fed to the dairy animals.

Other cash flows include $15,000 of family living expenses. Family living expenses are not included in the calculation of after-tax net farm income, but do affect the amount of funds available to repay debt principal.

The value of total assets equals $623,000, of which $15,000 are current assets, $60,000 are livestock inventories, $100,000 are machinery investment, $160,000 are building investment, and $288,000 are land investment. Depreciation on machinery and equipment investment equal $18,000. Interest bearing debt totals $119,925 and carries a 10.5 percent interest rate.

When calculating after-tax net farm income, a simplified version of the 1988 federal and Ohio tax specifications is used.

Milk and Feed Prices Used to Determine After-Tax Net farm incomes

Milk prices. Milk prices represents a 3.5 percent blend price, and are net prices after a 15 cent promotion assessment and a 10 cent marketing charge. Three different milk prices are used to determine after-tax net farm incomes:

1. **$11.80/cwt.** -- represents the average milk price in 1987.
2. **$11.30/cwt.** -- represents the average price farmers may receive in 1988.
3. **$10.80/cwt.** -- represents the average price farmers may receive in 1989.

Feed prices. The representative farm purchases 1,200 pounds of soybean oil meal (SBOM) per cow. Two differing SBOM prices are used:

1. **.11/lbs.** -- represents SBOM price consistent with 1987. Purchased feed costs total $151 per cow and replacement.

2. **.15/lbs.** -- represents SBOM farmers are likely to pay in 1988 and 1989. In this case, purchased feed costs total $199 per cow and replacement.

After-Tax Net farm incomes At Differing Milk and Feed Prices

After-tax net farm incomes resulting from the simulations are reported in table 2. The $11.80/cwt. milk and .11/lbs. SBOM prices are consistent with prices occurring in 1987. At these prices, after-tax net farm income equals $17,873. The $11.30/cwt. milk and .15/lbs. SBOM prices are averages that farmers are likely to occur in 1988. At these prices, after-tax net farm income equals $13,285. Therefore, simulated results indicate that net farm income in 1988 could be $4,588 lower than net farm income in 1987.

In 1989, milk price could average $10.80. At a $10.80/cwt. milk and .15/lbs. SBOM prices, after-tax net farm income equals $10,310. Given that net farm income in 1987 is $13,285, simulated results suggest that after-tax net farm income could decline by $2,975 between 1988 and 1989.

Incomes reported in table 2 are averages for a four year period. Over the four year period, yearly average net-incomes are declining for milk and feed price combinations containing the $11.30 and $10.80 milk prices. At these prices, the representative farm is accumulating debt because net farm income is less than the $15,000 withdrawal for family living expenses. Declining net farm incomes suggest that the long-run viability of the farm is questionable.

Responses to Counter Milk Price Decreases and Feed Price Increases

Dairy farmers have a number of responses to decreasing net farm incomes including:

Increasing Milk Production Per Cow. Generally, farm profitability increases as milk production per animal increases. To have the same after-tax net farm income at projected 1988 prices as compared to 1987 prices, milk production would have to increase by 986 pounds per animal (table 3), presuming that feed costs increase by $24 per 1000 pounds of milk production and all other costs remain constant. Increasing milk production generally requires an upgrading of a farm's nutrition, health, and breeding programs.

Decreasing Variable Costs Per Cow. To have the same after-tax net farm income at projected 1988 prices as at 1987 prices, variable costs per cow have to decrease by $79 (table 3). Variable costs can be decreased by purchasing inputs more economically or by increasing herd efficiencies. Examples of herd efficiency increases include (1) reducing the number of days cows are open, (2) reducing death losses, (3) reducing forced cow cullings, and (4) decreasing hired labor expenses per cow.

Decreasing the Farm's Overhead Costs. To have the same after-tax net farm income at 1988 prices as at 1987 prices, overhead costs on the simulated farm would have to be reduced by $3,330. Overhead costs are generally related to capital usage, and can be reduced by decreasing investment per cow and decreasing repair costs per cow.

Decreasing the Amount of Family Living Expenses. Decreasing family living expenses will not increase after-tax net farm income, but it will reduce the amount of net farm income a farm must generate to remain a viable operation.

Expanding the Farm Operation. In some instances, net farm income can be increased by adding more cows. For this strategy to be effective the return on the added assets must exceed the cost of debt. The simulated farm will reduce net farm income by adding cows if adding a cow requires $2,000 of additional assets ($850 for the purchase of the cow and $1,150 for other assets). Expansion requiring less than a $2,000 investment per cow will increase after-tax net farm income.

Decreasing the Size of the Farm Operation. After-tax net farm income may increase by selling segments of the operation that are not profitable. For example, some dairy farms could increase net farm income by selling less productive cows.

Changing a single management practice is not likely to offset declines in after-tax net farm incomes. Dairy farmers need to analyze all aspects of their operations, giving consideration to timeliness of operations, costs of management practices, and effective use of capital. Much of dairy farms' net income is related to production and management details. For example, do heifers calve near 24 months, is the conception rate on cows over 50 percent, is the environment in which cows are housed conducive to high milk production, and is the breeding program oriented towards producing high quality offspring? Many dairy farmers could benefit by making better use of individuals providing information, such as veterinarians, field representatives, and salespeople.

Summary

After-tax net farm incomes that dairy farmers receive are likely to decline because of decreasing milk prices and increasing feed prices. For a 50 cow "representative" Ohio dairy farm, after-tax net income could decline by $4,588 in 1988 and $2,975 in 1989. Declining net incomes may require dairy farmers to take actions that reduce the amount of the decline. Option that can be considered include increasing milk production per cow, reducing variable costs per cow, reducing the farm's overhead expenses, decreasing family living expenses, expanding the farm operation, or decreasing the size of the farm operation.

After-tax net farm incomes will vary with changes in herd sizes, production levels per cow, debt-to-asset ratios, and number of families working on the farm. For all dairy farm situations, however, declining milk prices and increasing feed prices will reduce after-tax net farm incomes. Most dairy farmers will have to respond in some manner.

Table 1. Production Levels, Costs, Cash Flows, and Financial Situation of the Simulated Dairy Farm.

Dairy Enterprise

50 Holstein cows
16,000 pounds of milk sold per cow
Feed requirements per cow and replacement (grown on the farm)
67 bushels of corn
10.10 tons of corn silage
4.58 tons of alfalfa
$344 of variable costs other than feed

Crop Enterprise

Crop	Acres	Variable Costs Per Acre	Yield Per Acre
Corn (grain)	28	$110	120 bu.
Corn silage	32	$95	16 tons
Wheat	20	$51	60 bu.
Alfalfa	112	$100	3 tons
Set-Aside	15	$30	

Cash Flows Per Year

Overhead expenses	$19,300
Machinery and equipment investment	$10,000
Principal payment on debt	$5,000
Interest payment on debt	$12,592
Family living expenses	$15,000

Assets and Liabilities

Total assets	$623,000
Total liabilities	$124,600
Interest-bearing debt	$119,925
Non-interest bearing liabilities	$4,675
Debt-to-asset ratio	.20

Table 2. A Dairy Farm's After-Tax Net farm income Under Differing Milk and Feed Prices[1].

Milk Price[2]	SBOM Price[3] .11/lbs.	SBOM Price[3] .15/lbs.
	-- after-tax net income --	
$11.80/cwt.	$17,873	$16,176
$11.30/cwt.	$15,059	$13,285
$10.80/cwt.	$12,114	$10,310

[1]Source: Simulated results for a farm having 50 cows and 240 acres of farmland.

[2]Net 3.5 percent blend price after 15 cent promotion assessment and 10 cent marketing charge.

[3]Soybean oil meal price.

Table 3. Milk Production Increases and Cost Decreases That Result In the Same After-Tax Net farm income As In 1987[1].

Changes	Prices Milk[2] SBOM[3]	 $11.30/cwt. $.15/lbs.	 $10.80/cwt. $.15/cwt.
Increase milk production per cow		986 lbs.	1,627 lbs.
Decrease variable costs per cow		$79	$156
Decrease overhead costs on the farm		$3,330	$7,645

[1]Simulated results for a farm having 50 cows and 240 acres of farmland. After-tax net farm income for 1987 is calculated using a $11.30/cwt. milk price and a $.11/lbs. SBOM price.

[2]Net 3.5 percent blend price after 15 cent promotion assessment and 10 cent marketing charge.

[3]Soybean oil meal price.

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